



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/565,265  | 01/25/2006  | Jurgen Denul         | 016782-0346         | 7815             |
| 23428 7590 07/01/2009<br>FOLEY AND LARDNER LLP<br>SUITE 500<br>3000 K STREET NW<br>WASHINGTON, DC 20007 |             |                      |                     |                  |
| EXAMINER  |             |                      |                     |                  |
| MILLER, DANIEL H  |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 1794  |             |                      |                     |                  |
| MAIL DATE   |             | DELIVERY MODE        |                     |                  |
| 07/01/2009  |             | PAPER                |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/565,265

**Applicant(s)**

DENUL ET AL.

**Examiner**

DANIEL MILLER

**Art Unit**

1794

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 3/10/2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 4-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. Claims 1 and 4-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Derflinger et al (US 7,067,191) in view of Yang (Materials Letters 57 (2003) 3305-3310).
2. Derflinger teaches a substrate covered by a metal layer (2b) and another layer containing nitrogen (2a) and then a second metal layer (3) covered by a carbide layer (4b) and then covered with a hard carbon layer (4a) (see figure 5). The top carbon containing layer can be optionally replaced with a diamond like coating (column 4 line 45-55). The deposition method includes the formation nano-crystalline Carbides in an inert atmosphere (Column 6 line 30-40; and column 7 line 27-33).
3. The layers can comprise Ti or Cr and the nitride containing layer can comprise CrN (see claims 7, 8, and 10).
4. Regarding claims 10-12, the layers have the same thickness as applicant's claimed thickness (see ref. claims 25-43).
5. Regarding claims 13-15, given the substantial similarities of the compositions and thickness of the layers they would be expected to have substantially similar properties.
6. Derflinger is silent as to a DLN (Diamond Like Nanocomposite) coating.
7. Yang teaches that DLN films are advantageous for protective coatings particularly those requiring high hardness and low friction in contact with counter

materials, and good adhesion between the film and substrate (see Intro.). The DLN films have advantages over traditional diamond like carbon film in that they adhere to a variety of substrates better and have excellent thermal stability not found in diamond like coatings and represent a significant advance in both stability and the ability to tailor specific properties of the coating (See Intro.).

8. It would have been obvious to one of ordinary skill in the art at the time of the inventions to substitute the DLN coating of Yang for the more traditional DLC coating of Derflinger because the DLN films have advantages over traditional diamond like carbon film in that they adhere to a variety of substrates better and have excellent thermal stability not found in diamond like coatings and represent a significant advance in both stability and the ability to tailor specific properties of the coating (See Intro Yang.), all of which would improve the wear resistant properties of the coating of Derflinger.

9. Regarding claims 16-17, Yang teaches a (PECVD) Plasma Enhanced Chemical Vapor Deposition (DLN) film produced in a manner substantially similar to applicant's disclosed coating and therefore would be expected by one of ordinary skill to have substantially similar composition. Further regarding claim 17, with regards to the claimed compositional percentages, in the alternative, it would be obvious to optimize the claimed percentages of components to within applicant's broadly disclosed range by optimizing the hardness and wear resistance of the coating, taking advantage of the DLN films ability to be tailored to have specific properties (as taught by Yang above). No patentable distinction is seen.

Art Unit: 1794

10. Regarding claims 18-19, Derflinger specifically teaches processing the carbon coating layers in an inert atmosphere (see above), while Yang teaches processing the coating in a mixture of Hydrogen, carbon containing gas also with an inert gas (Ar; see abstract). Given that the obvious rejection replaces the Yang top coating for the Derflinger and that both (especially the Yang coating) comprise an inert gas it would also be obvious to provide the inert Ar gas of Yang.

11. While Derflinger in view of Yang are silent as to the percentage of inert (Ar) gas present in the diamond film one of ordinary skill would expect to adjust the levels of each gas (or vapor) component used for formation of the coating in order to form an optimally coating with high hardness and low friction (as desired by Yang) and in so providing the coating provide a percentage of inert gas within applicants claimed range of, 0.5% to 5%.

### ***Response to Arguments***

12. Applicant's arguments filed 3/10/2009 have been fully considered but they are not persuasive.

13. Applicant's argument that one of ordinary skill would not have substituted the coating of Yang for that of Derflinger because it is a more complex coating is unconvincing. It would have been obvious to one of ordinary skill in the art at the time of the inventions to substitute the DLN coating of Yang for the more traditional DLC coating of Derflinger because the DLN films have advantages over traditional diamond

Art Unit: 1794

like carbon film in that they adhere to a variety of substrates better and have excellent thermal stability not found in diamond like coatings and represent a significant advance in both stability and the ability to tailor specific properties of the coating (See Intro Yang.), all of which would improve the wear resistant properties of the coating of Derflinger.

14. Applicant has provided no scientific rationale for why one of ordinary skill would not have combined the two references.

15. Regarding applicant's arguments that the claimed percentages are not taught or obvious, it would be obvious to optimize the claimed percentages of components to within applicant's broadly disclosed range by optimizing the hardness and wear resistance of the coating, taking advantage of the DLN films ability to be tailored to have specific properties (as taught by Yang above). No patentable distinction is seen.

16. Regarding newly added claims 18-19, Derflinger specifically teaches processing the carbon coating layers in an inert atmosphere (see above), while Yang teaches processing the coating in a mixture of Hydrogen, carbon containing gas also with an inert gas (Ar; see abstract). Given that the obvious rejection replaces the Yang top coating for the Derflinger and that both (especially the Yang coating) comprise an inert gas it would also be obvious to provide the inert Ar gas of Yang.

17. While Derflinger in view of Yang are silent as to the percentage of inert (Ar) gas present in the diamond film one of ordinary skill would expect to adjust the levels of each gas (or vapor) component used for formation of the coating in order to form an optimally coating with high hardness and low friction (as desired by Yang) and in so

Art Unit: 1794

providing the coating provide a percentage of inert gas within applicants claimed range of, 0.5% to 5%.

### ***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571)272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1794

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John J. Zimmerman/  
Primary Examiner, Art Unit 1794

/Daniel Miller/